**Unit 6 In Class Review ANSWERS:**

1. A researcher creates a 96% confidence interval in order to make a conclusion about the hypotheses Ho: μ = 85 and Ha: μ < 85.  What would his significance level (alpha) be for that test?

α = 0.02

1. A researcher completes a test of significance using a level of significance (a) of 0.03 and a sample size of 120. If he changed his sample size to 300, what would happen to Type I error, Type II error, and Power? (increase, decrease, same)

Type I = same Type II = decrease Power = increase

1. A researcher completes a test of significance for Ho: µ = 9 and Ha: µ > 9 using α = 0.03. He ends up rejecting Ho, and wants to complete a matching confidence interval to find the true mean value. What level of confidence should he use?

Confidence = 94%

1. A researcher completes a test of significance using a level of significance (α) of 0.07 and a sample size of 145. If he changed his significance level to 0.10, what would happen to Type I error, Type II error, and Power? (increase, decrease, same)

Type I = increase Type II = decrease Power = increase

1. A researcher creates a 92% confidence interval in order to make a conclusion about the hypotheses Ho: μ = 12 and Ha: μ ≠ 12.  What would his significance level (alpha) be for that test?

α = 0.08

1. A researcher completes a test of significance using a level of significance (a) of 0.08 and a sample size of 75. If he changed his significance level to 0.03, what would happen to Type I error, Type II error, and Power? (increase, decrease, same)

Type I = decrease Type II = increase Power = decrease

1. A researcher completes a test of significance for means and finds a test statistic of t = 3.22.  His sample size was 34, and his hypotheses were Ho: μ = 10 and Ha: μ > 10.  What would his p-value be for this test?

P(t > 3.22|df = 33) = tcdf(3.22, E99, 33) = 0.001438

1. A researcher completes a test of significance for Ho: µ = 120 and Ha: µ ≠ 120 using α = 0.07. He ends up rejecting Ho, and wants to complete a matching confidence interval to find the true mean value. What level of confidence should he use?

Confidence = 93%

1. A researcher completes a test of significance using a level of significance (a) of 0.04 and a sample size of 100. If he changed his sample size to 55, what would happen to Type I error, Type II error, and Power? (increase, decrease, same)

Type I = same Type II = increase Power = decrease

1. A researcher completes a test of significance for means and finds a test statistic of t = -2.15.  His sample size was 46, and his hypotheses were Ho: μ = 33.5 and Ha: μ ≠ 33.5.  What would his p-value be for this test?

2\*P(t < -2.15|df = 45) = 2\*tcdf(-E99, -2.15, 45) = 0.03697

1. I create a confidence interval and find (53.02, 56.78)
   1. What is my sample mean? 54.9
   2. What is my margin of error? 1.88
   3. The standard deviation is 8.7 and the sample size is 130. What is my confidence level?

t\* = 2.4638

P(-2.4638 < t\* < 2.4638) = tcdf(-2.4638, 2.4638, 129) = 98.494%

**p. 611 #2, 9, 13, 22, 32 (interval), 33 (interval)**

2) n = 21 df = 20 L1 = unscented L2 = scented L3 = L2 - L1

Ho: µd = 0 µd = scented - unscented

Ha: µd < 0

Conditions:

1) paired data 1) both sets of data are measured on the same subjects

2) SRS 2) assumed representative sample

3) pop > 10nd 3) There will be more than 210 subjects tested for this experiment

4) normal pop of diff. 4) normal prob. plot is linear --> normal population of diff. is assumed

or nd > 30

Conditions met 🡪 t-distribution 🡪 1 sample paired t-test

= -1.3571

P(t < -1.3571|df = 20) = 0.0949

We fail to reject Ho b/c p-value of 0.0955 > a = 0.05. We have insufficient evidence that the average difference between times to complete the maze with scented and unscented air less than 0 minutes. Therefore, the scent does not improve the time to complete the maze.

9) µ = 7.41 n = 112 = 7.68 s = 1.31 df = 111

Ho: µ = 7.41

Ha: µ ≠ 7.41

Conditions:

1) SRS 1) assumed Missouri babies are representative of all US babies

2) pop > 10*n* 2) there are more than 1120 babies born in the US

3) normal population or n > 30 3) n = 112 > 30

Conditions met 🡪 t distribution 🡪 1 sample t test

= 2.181 2\*P(t > 2.181) = 0.0313

We reject Ho b/c p-value of 0.0313 < α = 0.05. We have sufficient evidence that the true average weight of babies born in the US is not the same as that of babies born in Australia.

13)

|  |  |  |
| --- | --- | --- |
|  | **w/o cardiac disease** | **w/ cardiac disease** |
| **mean** | 69.8 | 74 |
| **std dev** | 8.7 | 7.9 |
| **n** | 2397 | 450 |

Conditions:

1) 2 independent SRS 1) Assumed representative samples

Those with cardiac disease are independent of those without cardiac disease

2) popW > 10*n*W 2) There are more than 23970 people without cardiac disease and more than

popC > 10*n*C 4500 people with cardiac disease

3) normal populations or 3) 2397 and 450 > 30

nW and nC > 30

Conditions met 🡪 t distribution 🡪 2 sample t Interval

df = 670

(69.8 – 74) + (1.9635) = (-5.01, -3.39)

We are 95% confident that the difference between the average ages of the patients without and with cardiac disease is between 5.01 and 3.39 years. Since the difference is negative, there is evidence that the average ages of those without cardiac disease is lower than those with cardiac disease.

Or: We are 95% confident that the average ages of those without cardiac disease is between 5.01 and 3.39 years lower than those with cardiac disease.

22)

|  |  |  |
| --- | --- | --- |
|  | **certified** | **uncertified** |
| **mean** | 35.62 | 32.48 |
| **std dev** | 9.31 | 9.43 |
| **n** | 44 | 44 |

Ho: µC = µU df = 86

Ha: µC > µU

Conditions:

1) 2 independent SRS 1) Assumed representative samples

Certified and uncertified teachers are independent of each other

2) popC > 10*n*C 2) There are more than 440 certified and 440 uncertified teachers

PopU > 10*n*U

3) normal populations or 3) 44 and 44 > 30

nC and nU > 30

Conditions met 🡪 t distribution 🡪 2 sample t test

= 1.572 P(t > 1.572) = 0.05984

We fail to reject Ho b/c p-value of 0.05984 > α = 0.05. We have insufficient evidence that the true mean reading scores of students of certified teachers is higher than those of uncertified teachers.

32) put data into L1 🡪 run T-Interval on L1, use 95% confidence

Conditions:

1) SRS 1) assumed the 6 bags are representative of all bags

2) pop > 10*n* 2) there are more than 60 bags of Fritos made

3) normal pop or or n > 30 3) normal probability plot is linear (one possible outlier)

🡪 assumed normal population

Conditions met 🡪 t distribution 🡪 1 sample t Interval

df = 5

We are 95% confident that the true average weight of the bags is between 35.061 grams and 36.006 grams. Since 35.4 (the claimed weight of the bags) is in the interval, we do not have evidence to suggest that the bags are not properly filled. It seems like the bags are being filled properly.

33) L1 = Color L2 = Word L3 = L1 – L2

µd = Color – word

Conditions:

1) paired data 1) both color and word score are measured on the same subjects

2) SRS 2) assumed representative sample

3) pop > 10nd 3) There will be more than 320 subjects tested for this experiment.

4) normal pop of diff. 4) normal prob. plot is linear --> normal population of diff. is assumed

or nd > 30

Conditions met 🡪 t-distribution 🡪 1 sample paired t-Interval

df = 31 95% confidence

We are 95% confidence that the average difference between the number of cards remembered correctly by color or by word is between -1.652 cards and 0.15193 cards. Since 0 is in the interval, we have evidence that there is no difference in the ability to remember cards by word or by color.